

Case Study

Elspec EQUALIZER Corrects Power Quality Issues at Lopez Sugar Mill



stopping scenario causes large and continuously varying KVA and kVAR demands. In addition to the issues related to the centrifuges, the following are typical problems at a sugar mill facility:

- Low power factor
- Voltage dips and overall voltage instability
- Inefficient power generation
- Live steam shortage

Low Power Factor

Some sugar mills have attempted to improve their power factor through the use of manual and/or automatic electromechanical capacitor banks. Manual banks can lead to over voltage that may damage equipment and/or trip generators and electrical protection devices. On the other hand, automatic banks do not operate quickly enough to properly compensate for the rapid load demand changes.

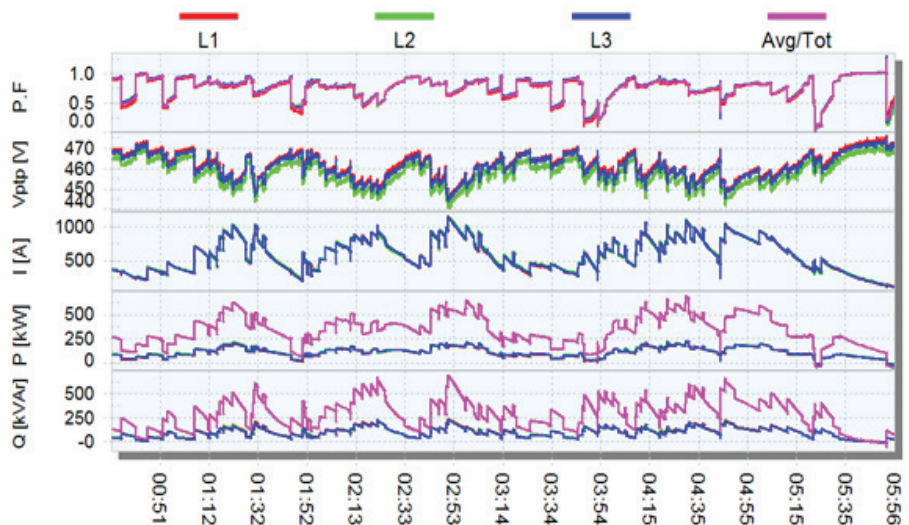
Voltage Dips/Instability

Due to the use of old governor-

Lopez Sugar in Sagay City, Philippines is a large sugar mill/refinery that had numerous power quality issues typical of those found in most mills. There are a variety of processes in a sugar mill that create an environment prime for the development of power quality issues. Not only is there machinery for cleaning, shredding/chopping, and juice extraction, but there are also boilers and generators that burn the remaining solids, called bagasse, for fuel. Additionally, centrifuges are used to separate sugar from any remaining impurities in the liquid.

Centrifuges used in sugar mills create unique power quality issues. Depending upon the size of the mill, there could be numerous centrifuges. Typically, these centrifuges are run by large motors (100-150 HP) that use (dual voltage) DC or AC drives or even regenerative drives.

Each of the centrifuges start and stop independently as the process dictates. This starting and



Poor Power Factor, Voltage Instability, and Dynamic Load Changes at Lopez

In This Document

Read how the Equalizer:

- Resolved low powerhouse power factor issues
- Solved voltage dip problems
- Provided necessary power for generators to run efficiently

driven and non-electrical control systems on many existing generators, response time to dynamic load changes is extremely slow. Further, electromechanical capacitor banks (and fixed) that may be used are not quick enough to capture such changes either. These two issues contribute significantly to voltage dips and overall voltage instability at sugar mills, which can cause motor inefficiencies, relay trips, and unnecessary UPS battery usage.

Inefficient Power Generation

To anticipate large, rapid load changes, sugar mills typically have to run generators at full capacity. Lopez Sugar had to run a large diesel generator to augment the needed power requirements of their facility. In mills that rely on steam turbine generators, running at full capacity means they have to get more live steam from their boilers just to be on standby for sudden large power demands in the factory. Getting more steam means consuming more water and burning more bagasse, adding to overhead expenses.

Live Steam Shortage

Since powerhouses need to draw steam for generators, plant engineers have to carefully allocate the live steam going to the processes. At Lopez Sugar, engineers had to notify the powerhouse before starting large loads in their refining section in anticipation of the sudden power demand.

The Solution

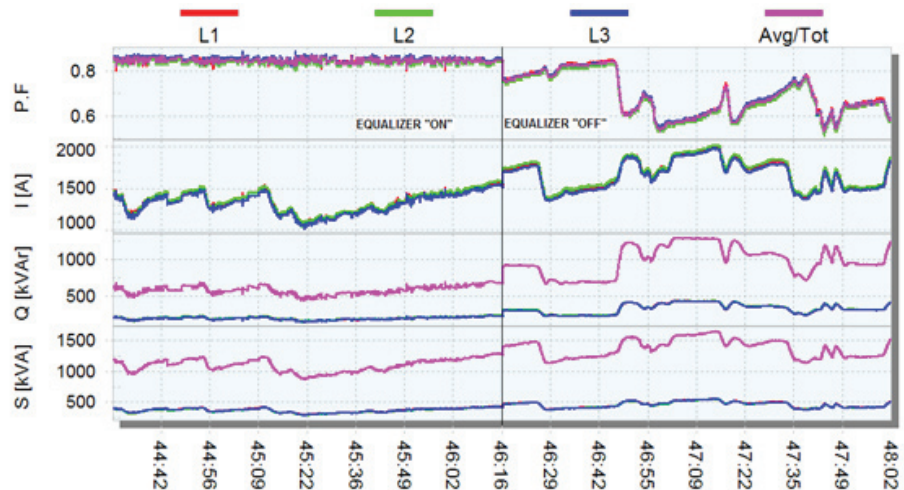
The Elspec Equalizer is the ideal solution for the power quality problems facing sugar mills,

offering the following benefits:

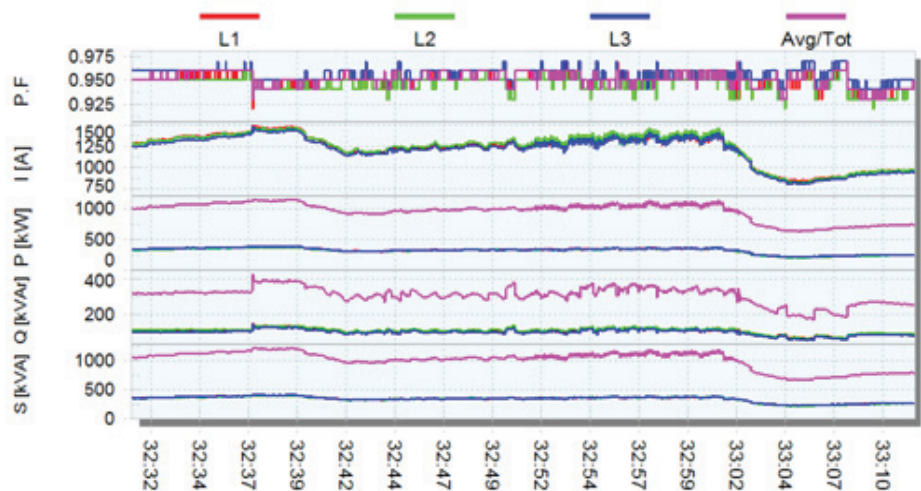
- Enhanced generator capacity
- Stable frequency and voltage
- Reduction in steam demand and improved productivity
- Energy & fuel savings

After installation of the Equalizer, Lopez Sugar was able to shut down their big diesel generator and switch to a smaller one, providing substantial savings in diesel fuel.

The following graphs show the before and after effects of the Equalizer at Lopez Sugar. There is a marked reduction on power demand.



Equalizer - ON / Equalizer - OFF



Stability of Power Factor, Current, and Power Variables with Equalizer.

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